

LASER COOLING AND TRAPPING

INTRODUCTION

During this century there has been a considerable amount of work to study and to manipulate the internal degrees of freedom of isolated atoms. Only in the last decade the external degrees of freedom have received attention. Physicists have learned to use the forces exerted by laser light to control isolated atoms and this has become a hot topic. Experiments demonstrating trapping of atoms are now presented almost everywhere. New and exciting topics as Bose-Einstein Condensation in a sample of trapped atoms or the production of non-classical states in a single trapped and laser cooled particle is now a reality.

The field of cooling and trapping has produced an enormous advance in time and frequency metrology, atomic optics and specially in ultracold atomic collisions. New theoretical insights into the effects of light on cold atoms and ions have also been achieved.

The techniques of laser cooling and trapping have matured to the point that the focus is now the development of new applications. In this special issue of the Brazilian Journal of Physics we are pleased to present a number of timely papers that cover many of the new frontiers and illustrate many exciting new ideas in this field.

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